

Common Core Standards Alignment Chart • Grade 4

Units	4.OA.1	4.OA.2	4.OA.3	4.OA.4	4.OA.5	4.NBT.1	4.NBT.2	4.NBT.3	4.NBT.4	4.NBT.5	4.NBT.6	4.NF.1	4.NF.2	4.NF.3	4.NF.4	4.NF.5	4.NF.6	4.NF.7	4.MD.1	4.MD.2	4.MD.3	4.MD.4	4.MD.5	4.MD.6	4.MD.7	4.G.1	4.G.2	4.G.3
Operations & Algebraic Thinking																												
Unit 1: Write an Equation	✓	✓																										
Unit 2: Solve Multi-Step Problems	✓	✓	✓																									
Unit 3: Factors and Multiples				✓																								
Unit 4: Generate Patterns					✓																							
Number & Operations in Base Ten																												
Unit 5: Use Place Value						✓	✓	✓																				
Unit 6: Add Multi-Digit Numbers									✓																			
Unit 7: Subtract Multi-Digit Numbers									✓																			
Unit 8: Multiplication Properties	✓	✓	✓	✓						✓																		
Unit 9: Multiply by One-Digit Number	✓	✓	✓	✓						✓																		
Unit 10: Multiply by Two-Digit Number	✓	✓	✓	✓						✓																		
Unit 11: Divide Two-Digit Numbers	✓	✓	✓	✓							✓																	
Unit 12: Divide Multi-Digit Numbers	✓	✓	✓	✓							✓																	
Number & Operations—Fractions																												
Unit 13: Find Equivalent Fractions												✓																
Unit 14: Compare and Order Fractions													✓															
Unit 15: Add and Subtract Fractions														✓														
Unit 16: Add and Subtract Mixed Numbers														✓														
Unit 17: Multiply Fraction/Whole Number															✓													
Unit 18: Tenths and Hundredths																✓	✓											
Unit 19: Compare Decimals																		✓										
Measurement & Data																												
Unit 20: Use Metric Measurements																			✓	✓								
Unit 21: Use Customary Measurements																			✓	✓								
Unit 22: Perimeter and Area																					✓							
Unit 23: Make Line Plots																						✓						
Geometry																												
Unit 24: Lines and Angles																										✓		
Unit 25: Measure Angles																							✓	✓	✓			
Unit 26: Classify Polygons																											✓	
Unit 27: Symmetry																												✓

Unit 1

Write an Equation

Standard

Operations & Algebraic Thinking

Use the four operations with whole numbers to solve problems.

4.OA.1. Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations.

4.OA.2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

Model the Skill

- ◆ Write the following sentences on the board:
18 is equal to 3 times as many as 6.
- ◆ **Ask:** *How else can we write this sentence in other words? (18 is equal to 6 multiplied by 3, etc.) How can we write this sentence using only numbers and symbols?*
- ◆ **Say:** *Think about the statement “3 times as many as.” How does that help you know what operation to use?*
- ◆ Assign the appropriate practice page to support students’ understanding of the skill. Focus on the language structure of each statement to help them yield corresponding equations. Remind students that a letter can stand for an unknown number in an equation. Remind them that an equation shows equal values on either side of the equal symbol.

Assess the Skill

Use the following problems to pre-/post-assess students’ understanding of the skill.

- ◆ Write the following sentences on the board and ask students to write an equation for each one.

18 is equal to 3 times as many as 6.

7 groups of 6 items is the same as 42 items.

32 is 4 times as much as 8.

Some number is equal to 19 plus 6.

- ◆ Then ask students to write their own story problems. **Say:** *Complete the story. Then write an equation to represent the story.*

_____ pirates found a sunken treasure chest filled with gold coins. They split the coins evenly among them and each received _____ coins. How many coins were in the chest? How many coins are in the treasure chest?

_____ **x** _____ **=** **C**

Unit 2

Solve Multi-Step Problems

Standard

Operations & Algebraic Thinking

Use the four operations with whole numbers to solve problems.

4.OA.3. Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Model the Skill

- ◆ Write the following problem on the board.

The deli has 16 jars of pickles. 5 jars are dill pickles and 4 jars are spicy pickles. The rest are sweet pickles. How many jars are sweet pickles (s)?

- ◆ **Ask:** *How would you solve this problem?* Lead students to see that the problem has two steps and write an equation to represent the problem.
 $16 = 5 + 4 + s$
- ◆ **Ask:** *How does the equation represent this problem? What does the variable stand for?* Help students understand that s is the unknown number of sweet pickle jars and that when all the types of pickle jars are added, they equal the total amount given.
- ◆ **Say:** *Now let's complete the equation and solve the problem. How can we find s ?* Help students first add $5 + 4$, rewriting the equation as $16 = 9 + s$. Remind students that addition and subtraction are related, so $s = 16 - 9$, or 7. Allow students to check their answer by replacing s with 7 in the original equation, proving it true.
- ◆ Assign the appropriate practice page to support students' understanding of the skill. Remind students that operations within parentheses are done first in solving an equation. Allow students to use manipulatives such as counters or to draw pictures to help them solve each problem.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

Last summer, Lily and Kaya went on a 160-mile bike trip. The trip took 3 days. They rode 41 miles the first day and 73 miles the second day. How many miles did they ride on the third day?

Five trays of cookies are on the table. Each tray has 9 cookies. We ate 6 cookies. How many cookies are left?

Unit 3

Factors and Multiples

Standard

Operations & Algebraic Thinking

Gain familiarity with factors and multiples.

4.OA.4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

Model the Skill

- ◆ **Write the following multiplication sentences on the board.**

$$1 \times 6 = 6$$

$$2 \times 3 = 6$$

- ◆ **Say:** *Factors are numbers that you multiply to get a product. Look at these number sentences. Point to a factor (1, 6, 2, or 3). What are factor pairs? (the two numbers you multiply). What factor pairs can I multiply to get a product of 6? (1 and 6, or 2 and 3) Have students use six counters to model factor pairs showing one group of 6, six groups of 1, two groups of 3, and three groups of 2.*
- ◆ **Ask:** *Can we make any more factor pairs for 6? (no) So what are the factors of 6? (1, 2, 3, 6) Lead students to see that each factor of a number divides that number without a remainder.*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. Point out that some numbers have only 2 factors, 1 and the number. You may wish to tell students that these numbers have a special name. They are called prime numbers.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ **Ask:** *How old are you? List the factors of that number. Then list the first 5 multiples of that number.*

Unit 4

Generate Patterns

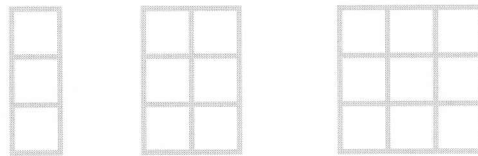
Standard

Operations & Algebraic Thinking Generate and analyze patterns.

4.OA.5. Generate a number or shape pattern that follows a given rule.
Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.

Model the Skill

- ◆ Draw the following figures on the board.



- ◆ **Say:** We are going to look for patterns today. Look at these figures made from squares. How is the second figure different from the first? (It has 3 more squares.) How is the third figure different from the second? (It has 3 more squares.) How many squares should the next figure have? (12)
- ◆ **Ask:** How does the rule “add 3” help us understand the pattern? (It describes how the pattern increases.) Have a volunteer extend the pattern by drawing the next two figures. (3 x 4 squares; 3 x 5 squares)
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students’ understanding of the skill.

- ◆ **Ask:** How would you complete the following patterns?

1, 3, 7, 15, 31, ____, ____, ____

108, 90, 72, ____, ____, ____

Unit 5

Use Place Value

Standard

Number & Operations in Base Ten

Generalize place value understanding for multi-digit whole numbers.

- 4.NBT.1.** Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.
- 4.NBT.2.** Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
- 4.NBT.3.** Use place value understanding to round multi-digit whole numbers to any place.

Model the Skill

- ◆ Draw the following place value chart on the board.

hundred thousands	ten thousands	thousands	hundreds	tens	ones

- ◆ **Say:** Look at the place value chart. On this chart, how many places are there? (6) Which place is the greatest? (hundred thousands) Point out that each place is 10 times more than the place to its right.
- ◆ **Ask:** If we write the number 56,329 in the place value chart, what place is the digit 3? (hundreds) How do you know? (The number has 5 digits; 3 is the third digit from the right, so it is in the hundreds place.)
- ◆ Demonstrate how to use place value to write the word name for the number. (fifty-six thousand three hundred twenty nine) as well as the expanded form. ($50,000 + 6,000 + 300 + 20 + 9$)
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ **Ask:** How would you write the following numbers in expanded form and written as words?
- ◆ **Say:** Explain which of the two numbers is greater and why.

867,879

56,809

892,005

56,089

Unit 6

Add Multi-Digit Numbers

Number & Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

4.NBT 4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Model the Skill

- ◆ Write the following problem on the board in a place value chart.

$$1,215 + 834$$

	thousands	hundreds	tens	ones
	1,	2	1	5
+		8	3	4

- ◆ **Say:** *Today we are going to add numbers to find the sum. The sum is the total of two or more numbers. Look at this problem. Why do you think the numbers are in a place value chart?* Help students understand that in the standard algorithm, we add the ones, then tens, then hundreds, and so on.
- ◆ **Ask:** *What is the sum? (2,094) Did you have to regroup? (yes) What does regroup mean? (example: trade 10 ones for 1 ten) Review how to regroup if necessary.*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. Point out that students can tell about how much the sum will be by looking at the highest digits of the number.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$508 + 275$$

$$3,096 + 345$$

$$53,308 + 22,821$$

$$671 + 10,350$$

Unit 7

Subtract Multi-Digit Numbers

Standard

Number & Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

4.NBT.4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Model the Skill

- ◆ Draw the following problem on the board in a place value chart.

$$25,083 - 13,241$$

	ten thousands	thousands	hundreds	tens	ones
	2	5,	0	8	3
-	1	3,	2	4	1

- ◆ **Say:** Today we are going to subtract greater numbers. When you subtract a number from another, the result is called the difference. Look at this problem. Why do you think the numbers are in a place value chart? Help students understand that in the standard algorithm, we subtract the ones, then tens, then hundreds, and so on.
- ◆ **Ask:** What is the difference? (11,842) Did you have to regroup? (yes) Review how to regroup as necessary.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. Remind students that they can use estimation to make sure their answer is reasonable and they can check their work by adding one of the numbers to the difference to make sure their answer is accurate.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$3,096 - 266$$

$$17,084 - 45$$

$$47,378 - 1,345$$

$$23,834 - 10,416$$

Unit 8

Multiplication Properties

Standard

Number & Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

4.NBT.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Model the Skill

- ◆ Write the following problem on the board in a place value chart.

$$3 \times 5 =$$

- ◆ **Say:** *We are going to be learning some interesting things about multiplication. For example, you can multiply numbers in any order and the product is the same. That is called the Order Property, or the Commutative Property, of Multiplication. Look at this problem. What is the product of 3×5 ? (15) What is the product of 5×3 ? (15) Have students use counters to show 3 groups of 5 and then 5 groups of 3 to prove the product is the same.*
- ◆ **Ask:** *How would you find the product of 4×5 ? (Make 4 groups of 5 or 5 groups of 4.) What is the product of 15×3 ? (45) What is the product of 4×5 ? (20) How do you know? (can prove it with counters or by knowing the order property)*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. Remind students that they can use estimation to make sure their answer is reasonable.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$3 \times 7 = 7 \times \underline{\quad}$$

$$4 \times 17 = (4 \times \underline{\quad}) + (4 \times 10)$$

$$3 \times 3 \times 4 = (3 \times \underline{\quad}) \times 4 = 3 \times (3 \times \underline{\quad}) =$$

$$4 \times 12 \times \underline{\quad} = 0$$

$$3 \times 8 \times \underline{\quad} = 24$$

Unit 9

Multiply by a One-Digit Number

Standard

Number & Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

4.NBT.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Model the Skill

- ◆ Draw the following problem and model on the board.

$$3 \times 13 \quad (3 \times 3) \rightarrow \begin{array}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|} \hline & & & & & & & & & & & & & & & & \\ \hline & & & & & & & & & & & & & & & & \\ \hline & & & & & & & & & & & & & & & & \\ \hline \end{array} \leftarrow (3 \times 10)$$

- ◆ **Ask:** Who can tell me about the Distributive Property? Remind students that they can break a factor into two parts, then multiply each part and add the results. Have them look at the problem on the board.
- ◆ **Ask:** How does the model show the Distributive Property? (The factor 13 is separated into 3 tens and 3 ones.) How does that help you multiply? (You can multiply the ones and then the tens.) Help students connect using the Distributive Property to writing partial products as a way to multiply. Remind them to add to get the final product.

$$\begin{array}{r} 13 \\ \times 3 \\ \hline 9 \leftarrow (3 \times 3) \\ + 30 \leftarrow (3 \times 10) \\ \hline \end{array} \leftarrow (3 \times 3) + (3 \times 10)$$

- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. Remind students that they can use estimation to make sure their answer is reasonable.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$3 \times 23$$

$$4 \times 98$$

$$3 \times 271$$

$$5 \times 376$$

$$524 \times 6$$

Unit 10

Multiply by a Two-Digit Number

Standard

Number & Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

4.NBT.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Model the Skill

- ◆ Write the following problem on the board.

$$\begin{array}{r} 23 \\ \times 12 \\ \hline 46 \\ + 230 \\ \hline \end{array}$$

◆ (multiply ones)
◆ (10 x 23)
◆ (product)

- ◆ **Say:** *Today we are going to multiply by a two-digit number.* Have students look at the problem. **Ask:** *How do you multiply 23 by 2?* (multiply the ones by 2, and then multiply the tens by 2.) *How do you multiply 23 by 10?* (multiply the ones by 10, and then multiply the tens by 10.)
- ◆ **Ask:** *When you multiply by the tens digit, what digit what do you know about your answer?* (You know there will always be a zero in the ones place.)
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$30 \times 23$$

$$42 \times 65$$

$$21 \times 27$$

$$50 \times 36$$

$$24 \times 62$$

Unit 11

Divide Two-Digit Numbers

Standard

Number & Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

4.NBT.6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

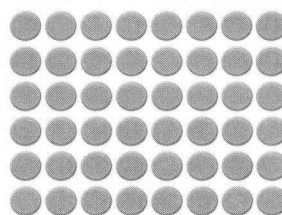
Model the Skill

- ◆ Draw the following model and problem on the board.

$$48 \div 8$$

$$8 \overline{)48}$$

← quotient



- ◆ **Ask:** *What do you know about division?* Have students talk about the problem and explain how the array shows division. Students should see that the total, 48, is divided into 6 rows and 8 columns. **Ask:** *What is the quotient of 48 divided by 8?* (6) Remind students that the result of dividing, or answer, is called the quotient.
- ◆ **Ask:** *What if we are dividing 50 by 8?* Draw 2 more counters onto the array and then have students model making 8 groups of six once more and seeing the remainder that would be left.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$69 \div 3$$

$$51 \div 3$$

$$85 \div 5$$

$$47 \div 4$$

$$82 \div 4$$

Unit 12

Divide Multi-Digit Numbers

Standard

Number & Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

4.NBT.6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Model the Skill

- ◆ Write the following problem on the board.

$$488 \div 2$$

$$\begin{array}{r} \text{← quotient} \\ 2 \overline{) 488} \end{array}$$

- ◆ **Say:** *We are going to divide greater numbers today. Can you tell me the quotient of 488 divided by 2? (244)* Point out connections to place value and to multiplication by showing how you use the divisor to divide each place. First, the hundreds, then the tens, then the ones.
- ◆ **Say:** *Now we are going to divide 488 by 8. Can you tell me the quotient of 488 divided by 8? (61)* Point out how when there aren't enough hundreds to divide, you move on to the next place value and try to divide into the tens place.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$693 \div 3$$

$$651 \div 3$$

$$856 \div 5$$

$$475 \div 4$$

$$824 \div 4$$

Unit 13

Find Equivalent Fractions

Standard

Number & Operations—Fractions

Extend understanding of fraction equivalence and ordering.

4.NF.1. Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

Model the Skill

- ◆ Hand out fraction strips.
- ◆ **Say:** Look at the fraction strips on the page. They show equivalent fractions. Equivalent fractions name the same amount. Which fractions are equal to one-half? ($2/4$, $4/8$) How do you know?
- ◆ Lead students to recognize that all the strips are the same size, or equal to 1 and that each is divided into a different number of equal parts. $2/4$ and $4/8$ both show the same amount as $1/2$.
- ◆ **Ask:** Are $2/4$ and $4/8$ equivalent fractions? (yes) $1/2$, $2/4$, and $4/8$ are equivalent fractions. They all name the same amount. You may wish to have students use fraction bars to prove this is true by placing fourths and eighths on top of one-half.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. Remind students that when writing a fraction, the denominator tells how many equal parts are in the whole. The numerator tells how many of those parts you are considering.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$\frac{1}{\square} = \frac{2}{4}$$

$$\frac{2}{\square} = \frac{1}{4}$$

$$\frac{\square}{8} = \frac{3}{4}$$

$$\frac{2}{\square} = \frac{4}{4}$$

$$\frac{1}{\square} = \frac{2}{8}$$

$$\frac{1}{\square} = \frac{4}{8}$$

$$\frac{2}{\square} = \frac{1}{3}$$

$$\frac{1}{\square} = \frac{3}{6}$$

Unit 14

Compare and Order Fractions

Standard

Number & Operations—Fractions

Extend understanding of fraction equivalence and ordering.

4.NF.2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.

Model the Skill

- ◆ Draw the following expression and corresponding model on the board.

$$\frac{3}{4} \bigcirc \frac{1}{2}$$

- ◆ **Say:** *Today, we are going to compare fractions. How can we tell if $\frac{3}{4}$ is greater than $\frac{1}{2}$? Guide students to show $\frac{1}{2}$ on the picture and then show $\frac{3}{4}$ on the same picture.*
- ◆ **Ask:** *Which symbol should we use to complete the number sentence? ($>$; greater than) Have students read the comparison aloud: $\frac{3}{4}$ is greater than $\frac{1}{2}$. Tell students one way to know if a fraction is more or less than $\frac{1}{2}$ is to write an equivalent fraction for $\frac{1}{2}$. Use the following problem as an example. $\frac{1}{2} = \frac{3}{6}$; $\frac{2}{6}$ is less than $\frac{3}{6}$, so $\frac{2}{6} < \frac{1}{2}$.*

$$\frac{2}{6} \bigcirc \frac{1}{2}$$

- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. Point out that if the numerators are the same, students can just compare the denominators, remembering that halves are greater than thirds or fourths, etc.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$\frac{2}{8} \bigcirc \frac{5}{8}$$

$$\frac{1}{8} \bigcirc \frac{1}{2}$$

$$\frac{3}{6} < \frac{\square}{6}$$

$$\frac{2}{4} \bigcirc \frac{1}{3}$$

$$\frac{4}{4} \bigcirc \frac{3}{3}$$

$$\frac{3}{3} > \frac{\square}{4}$$

Unit 15

Add and Subtract Fractions

Standard

Number & Operations—Fractions

Extend understanding of fraction equivalence and ordering.

Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

4.NF. 3. Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.

- Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
- Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.
- Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
- Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

Model the Skill

- ◆ Draw $1/3 + 1/3$ on the board.
- ◆ **Say:** Today we are going to add like fractions. Like fractions have the same denominator. **Ask:** What do we do when we add like fractions? (add the numerators) What is the sum of $1/3 + 1/3 + 1/3$? ($3/3$ or 1)
- ◆ **Ask:** What is the sum of $2/3 + 1/3$? ($3/3$) How do you know? Draw models and Discuss how $2/3$ can be visualized as $1/3 + 1/3$. **Say:** We can decompose any fraction into a sum of its parts. Look at the next problem. What is the sum? ($4/4$ or 1) How do you know?
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$\frac{2}{8} + \frac{5}{8}$$

$$\frac{1}{6} + \frac{2}{6}$$

$$\frac{2}{5} + \frac{2}{5}$$

$$\frac{1}{4} + \frac{3}{4}$$

$$\frac{3}{10} + \frac{4}{10}$$

$$\frac{5}{12} + \frac{4}{12}$$

Unit 16

Add and Subtract Mixed Numbers

Standard

Number & Operations—Fractions

Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

4.NF.3. Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.

- Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
- Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation.
- Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
- Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

Model the Skill

- ◆ Write the following problem on the board. $1\frac{2}{4} + \frac{1}{4}$
- ◆ **Say:** Today we are going to add mixed numbers. A mixed number is a whole number and a fraction together. Look at the problem. Point to the mixed number. **Ask:** How would you show a mixed number if you were drawing a model? (one whole circle or rectangle partitioned in quarters and shaded, $4/4$, and one identical figure with $2/4$ shaded) Then draw the model on the board.
- ◆ **Ask:** How can we add $1\frac{2}{4} + \frac{1}{4}$? (add the fractions, then add the whole number(s)) Point out that the denominators are the same, so add the numerators. What is the sum? ($1\frac{3}{4}$) How do you know? Discuss how the picture shows the addition. Have students count the total number of shaded parts and write an improper fraction, $7/4$, then write the total as a mixed number. Make sure students understand that $4/4$ is equivalent to 1, so $7/4$ is $1\frac{3}{4}$.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$1\frac{3}{4} + \frac{3}{4} \quad 2\frac{2}{3} + \frac{2}{3} \quad 3\frac{2}{4} - \frac{1}{4} \quad 1\frac{2}{4} + 1\frac{3}{4}$$

Unit 17

Multiply a Fraction by a Whole Number

Standard

Number & Operations—Fractions

4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

- a. Understand a fraction a/b as a multiple of $1/b$.
- b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number.
- c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.

Model the Skill

- ◆ Draw the following problem on the board.

$$5 \times \frac{1}{4}$$

- ◆ **Say:** *Today we are going to multiply a whole number and a fraction. Remember, we multiply equal groups. Look at the problem. How many groups of $1/4$ will we have? Draw a picture show the multiplication? (two shapes, partitioned into quarters with 5 one-fourth parts are shaded, $5 \times 1/4 = 5/4$) Have students record the product as an improper fraction and as a mixed number. Continue in the same fashion for the problem below.*

$$4 \times \frac{1}{3}$$

- ◆ Point out that 4 written as a fraction is $4/1$. **Ask:** *How can we multiply $4/1 \times 1/3$? (Multiply the numerators and then the denominators, $4 \times 1 = 4$ and $1 \times 3 = 3$, $4/3$ or $1 \frac{1}{3}$.) Allow students to explore multiplying a fraction and a whole number.*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$10 \times \frac{1}{10}$$

$$3 \times \frac{1}{5}$$

$$7 \times \frac{1}{6}$$

$$6 \times \frac{1}{4}$$

$$2 \times \frac{3}{4}$$

$$3 \times \frac{2}{5}$$

$$4 \times \frac{3}{6}$$

$$9 \times \frac{1}{5}$$

Unit 18

Tenths and Hundredths

Standard

Number & Operations—Fractions

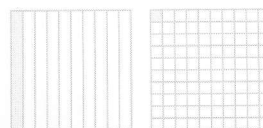
Understand decimal notation for fractions, and compare decimal fractions.

4.NF.5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.

4.NF.6. Use decimal notation for fractions with denominators 10 or 100.

Model the Skill

- ◆ Draw the following models on the board.

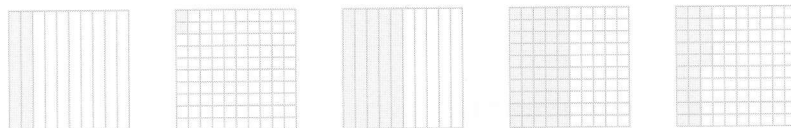


- ◆ **Say:** Today we are going to look at a different way to write fractions. Decimals also represent a part that is less than one whole. **Ask:** What do you know about decimals? Record students' answers, being sure to elicit that decimals have a decimal point, that the denominator is understood as tenths, hundredths, etc., depending on the place of the digit. Draw a place value chart on the board showing hundreds, tens, ones, tenths, and hundredths.
- ◆ **Ask:** Look at this first model. What fraction can you write to represent the shaded area? ($1/10$) How do we write the decimal for $1/10$? Help students understand that numbers left of the decimal point are whole numbers and that numbers right of the decimal point are "fractions." Write 0.1 and then help students write the word name: one-tenth. Note that the word name is the same for the fraction and the decimal.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. Point out that the decimal point is written and read as "and" when it follows a whole number greater than zero. So, for example, 1.4 is read as one and four-tenths.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ **Say:** Write a fraction that describes each model. Then write an equivalent decimal.



Unit 19

Compare Decimals

Standard

Number & Operations—Fractions

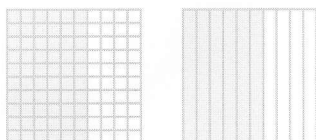
Understand decimal notation for fractions, and compare decimal fractions.

4.NF.7. Compare two decimals to hundredths by reasoning about their size.

Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.

Model the Skill

- ◆ Draw the following models on the board.



- ◆ **Say:** *Today we are going to compare decimals.* Have students write the meaning of the comparison symbols. **Ask:** *Which decimal is greater in the problem? (neither, they are equal) How do you know?* Have students look at the picture. Each square is the same size and represents the same whole. Discuss that while the numbers show tenths and hundredths, they are equivalent decimals, so if we think of them as fractions with the same denominator, we compare the numerators: $60/100$ is equal to $6/10$.
- ◆ **Ask:** *So, what symbol do we write in the oval? (=) Why?* Help students understand that the symbol must make the number sentence true. Continue by adding and deleting shading so students can compare great than and less than values.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ Have students use symbols to make the following expressions true.

$$0.60 \bigcirc 0.6 \qquad 0.75 \bigcirc 0.57 \qquad 0.05 \bigcirc 0.15$$

Unit 20

Use Metric Measurements

Standard

Measurement & Data

Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

- 4.MD.1.** Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.
- 4.MD.2.** Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

Model the Skill

- ◆ Display the following on the board:

1 meter (m) = 100 centimeters (cm)

1 kilometer (km) = 1,000 meters (m)

Metric Units of Length			
	centimeters	meters	kilometers
objects			

- ◆ **Ask:** *What do we use kilometers to measure? (distances) What do we use meters to measure? (length) What do we use centimeters to measure? (short lengths) Use the chart to organize students' responses on the board and discuss the varied things we can measure using metric units of length. To be sure that students understand the relative size of the units, display a centimeter ruler and a meter stick.*
- ◆ **Say:** *Sometimes, when a measurement is given in a larger unit, we want to convert it to a smaller unit. How many centimeters are equal to 1 meter? (100) Help students understand that they need to multiply to convert from a larger unit to a smaller unit, and that they will get more smaller units. Continue in the same fashion for kilometer and meter.*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following activity to pre-/post-assess students' understanding of the skill.

- ◆ Ask students to measure the length of several classroom objects using the appropriate metric units. Be sure to have them check their measurements for precision and accuracy.

Unit 21

Use Customary Measurements

Standard

Measurement & Data

Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

4.MD.1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.

4.MD.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit.

Model the Skill

- ◆ **Ask:** *What do we use miles to measure? (distance) What do we use yards and feet to measure? (length) What do we use inches to measure? (short lengths)* Make a list of students' responses on the board and discuss the varied things we can measure using customary units of length. Use inch rulers, yardsticks, and a map to be sure students understand the relative size of the units.
- ◆ **Say:** *Sometimes, when a measurement is given in a larger unit, we want to convert it to a smaller unit. How many inches are equal to 1 foot? (12 in) To 1 yard? (36 in)* Help students understand that they need to multiply to convert from a larger unit to a smaller unit, and that they will get more smaller units. Continue in the same fashion for feet and yards and for feet and miles.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. Point out the abbreviations that are commonly used for customary units of length.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ Ask students to measure the length of several classroom objects using the appropriate customary units. Be sure to have them check their measurements for precision and accuracy.

Unit 22

Perimeter and Area

Standard

Measurement & Data

Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

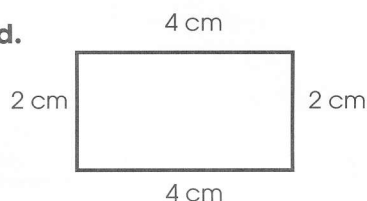
4.MD.3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Model the Skill

- ◆ **Ask:** What do you know about perimeter? Does this classroom have a perimeter? Discuss that perimeter is the distance around something and that it can be measured with units of length.

- ◆ **Draw the following rectangle on the board.**

Ask: What does the picture show? (a rectangle) How can we find the perimeter of the rectangle? (add the lengths of the sides; $P = 12$ cm)



- ◆ **Ask:** How else can we find the perimeter of a rectangle? (We can use a formula.) We have two lengths that are the same and two widths that are the same, so we can add and then multiply by 2. Help students understand the formula $P = 2 \times (l + w)$ and why it works for rectangles by using the unit measurements in the formula.
- ◆ **Ask:** How else can we find the area of a rectangle? (We can use another formula.) We multiply the length by the width to find the area. Help students understand the formula $A = l \times w$ and why it works for rectangles by using the unit measurements in the formula.
- ◆ **Ask:** What is the area of this rectangle? (8 square centimeters)
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ Ask students to measure the length and width of several classroom objects using applicable metric or customary units. Be sure to have them check their measurements for precision and accuracy. Then have them use the formulas for area and perimeter to derive the measurements.

Unit 23

Make Line Plots

Standard

Measurement & Data

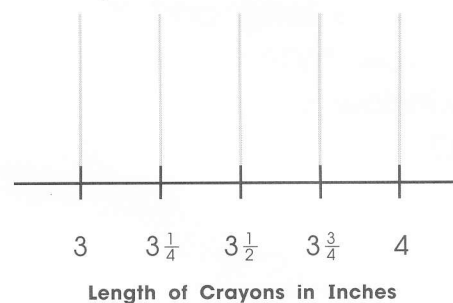
Represent and interpret data.

4.MD.4. Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.

Model the Skill

- Show the following data table and line plot.

Length of Crayons in Inches	Number of Crayons
3	
$3\frac{1}{4}$	
$3\frac{1}{2}$	
$3\frac{3}{4}$	
4	



- Say:** You can use a line plot to show data, such as a set of measurements. The line plot here shows all of the inch measurements that were recorded in the table. We will complete the line plot by putting an x for every crayon on the line that connects to each measurement.
- Ask:** According to the table, how many crayons were three inches? (1) So how would I show that quantity on the line plot? (put 1 x on the line connected to the 3 label on the x axis) Continue on with each row of the data chart, until the line plot is complete. Then ask: Why is this a good way to show data? (allows people to quickly see which measurements were more common, or less common)
- Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following activity to pre-/post-assess students' understanding of the skill.

- Using meter sticks, yard sticks, or tape measures, ask student pairs to measure each other's height. Have them report back to the class and combine and record the data in a tally chart. Then ask them to use the class data chart to create a line plot.

Unit 24

Lines and Angles

Standard

Geometry

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

4.G.1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

Model the Skill

- ◆ **Draw the following figures on the board:**

•
B

point



line (\overleftrightarrow{XY} or \overleftrightarrow{YX})



line segment (\overline{CD} or \overline{DC})

- ◆ **Say:** *Today, we are going to draw some geometric figures. Describe the figures above as you draw each one on the board. Help students discern that a point is an exact location. **Say:** A line segment is straight and has two endpoints. A line is straight, but it has no endpoints and it goes on forever in both directions. Discuss how the figures are labeled and the symbols used to name each.*
- ◆ **Ask:** *How are you going to draw a line segment? (use a straight edge or ruler to draw a line between two points) How are you going to write the label? (label one endpoint B and the other F on the drawing; use the symbol for line segment above the letters BF to name it)*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following activity to pre-/post-assess students' understanding of the skill.

- ◆ Using a ruler, ask students to draw and label the following figures:
- line AB
 - point G
 - line segment FG

Unit 25

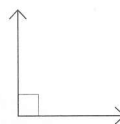
Measure Angles

Measurement & Data

Geometric measurement: understand concepts of angle and measure angles.

- 4.MD.5.** Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement.
- 4.MD.6.** Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
- 4.MD.7.** Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram

- ◆ Draw a right angle on the board.

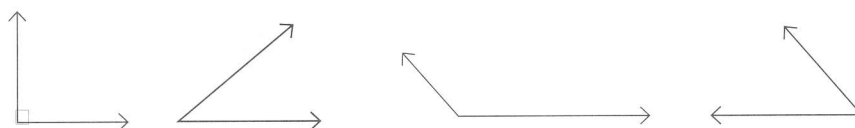


- ◆ **Say:** *We are going to find some right angles in our classroom. A right angle looks like the corner of this page.* Remind students that an angle is formed by two rays with the same vertex and that perpendicular lines form right angles.
- ◆ **Ask:** *What right angles can you see in our room? (corners of windows, doors, books, etc.)* Draw a circle on the board with perpendicular lines through the center to create four right angles. Relate angle measures to turns. **Say:** *We measure angles in degrees. A right angle measures 90 degrees. A right angle is a quarter turn.*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. Demonstrate how to use the corner to determine which angle is greater than, less than, or equal to 90°. Point out that angles are named by their relationship to a right angle.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ Ask students to draw examples of right, acute, and obtuse angles.
- ◆ Then have them use a protractor to measure and describe the following angles.



Unit 26

Classify Polygons

Standard

Geometry

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

4.G. 2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

Model the Skill

- ◆ **Say:** We are going to use what we know about lines and angles to identify quadrilaterals. A quadrilateral is a polygon with four sides. Remind students that a polygon is a closed, flat shape with sides that are line segments. Have students list the names of as many polygons as they can.

- ◆ Draw the following shapes on the board.



fig. 1

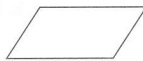


fig. 2



fig. 3



fig. 4

- ◆ **Ask:** How do you describe a rectangle? (four sides, opposite sides are parallel, four right angles) Have students point out parallel sides and right angles. **Say:** Now look at figure 2. Tell me how this parallelogram is different than a rectangle. (no right angles) Tell students that a rectangle is a special type of parallelogram because it has right angles.
- ◆ Point out that a rhombus (fig. 3) has four sides of equal length and opposite sides are parallel, so a square is a special type of rhombus. A trapezoid (fig. 4) is different from a rhombus, because it has only 1 pair of parallel sides.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ Ask students to draw examples of the following shapes. Then have them describe their drawings using as many of the applicable labels from the list below as apply.
 - square
 - rhombus
 - trapezoid
 - rectangle
 - parallelogram
 - triangle
 - right triangle
 - isosceles triangle
 - equilateral triangle
 - scalene triangle

Unit 27

Symmetry

Standard

Geometry

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

4.G 3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Model the Skill

- ◆ **Say:** We are going to cut shapes out of folded paper today to learn about symmetry. A line of symmetry divides a figure into two congruent parts. Remind students that when two figures are congruent, they are exactly the same shape and same size.
- ◆ Help students draw a 1/2 heart on a separate sheet of folded paper. Have students cut out the figure, being careful not to cut the fold. **Ask:** What shape do you have when you unfold the paper? (a heart) The fold line is a line of symmetry. The fold divides the shape into two matching parts.
- ◆ Help students complete the activity page, drawing the line of symmetry on the fold of each opened shape. Discuss why each shape is symmetrical. Discuss how both parts divided by the line of symmetry are congruent. If there is time, allow students to fold a paper twice and cut out a design.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ Ask students to draw as many lines of symmetry as they can for each figure.

